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File: PGPB

Nov 7, 2002

DOCUMENT-IDENTIFIER: US 20020164009 A1
TITLE: Gateway digital loop carrier device

*GR-303 interface
with managed objects*

Abstract Paragraph:

A gateway digital loop carrier device accommodates an integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface, executes an interface conversion between TR-008 and TR/GR-303, and connects the subscriber to a switch implementing a TR-303 or GR-303 interface.

Summary of Invention Paragraph:

[0005] Over the recent years, the switch and the RDT based on TR-303 or GR-303 as a standard substitute for TR-008 has been spreading (the RDT based on TR/GR-303 will hereinafter be referred to as a "TR/GR-303RDT" as the case may be) for the purposes of efficiently utilizing transmission path bandwidth, doing a standardized operation and management and expanding the subscribers.

Summary of Invention Paragraph:

[0014] According to the present invention, the gateway digital loop carrier device may accommodate the integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface, and may connect the subscriber to the switch implementing a TR-303 or GR-303 interface.

Summary of Invention Paragraph:

[0015] The gateway digital loop carrier device according to the present invention may further comprise a signaling converting unit for converting a subscriber line (signaling) system between TR-008 and TR-303 or GR-303.

Summary of Invention Paragraph:

[0016] The gateway digital loop carrier device according to the present invention may further comprise an ISDN overhead converting unit for converting a protocol of overhead information on an ISDN D+(plus) channel between TR-008 and TR-303 or GR-303.

Detail Description Paragraph:

[0063] According to this definition, the TR-303EOC based monitoring/controlling system is actualized by mapping a physical resource (e.g., a telephone line) of the remote digital terminal to an abstract model known as a managed object, and executing a variety of operations with respect to this abstract model.

Detail Description Paragraph:

[0066] TR-303 defines isdnLineTermination and isdnFramedPathTermination as ISDN managed objects, and also specifies attributes defined in those managed objects and formulates operations for the managed objects.

Detail Description Paragraph:

[0070] On the other hand, if a trouble occurs on the transmission path between the remote digital terminal and the integrated access device in cases other than ISDN, there is a problem of how to make it appear to be the switch. TR-303 is based on

the premise of directly accommodating the telephone lines. Therefore, TR-303 has no rule of how to notify (which managed object and with what attribute) if a trouble occurs in DS1 when accommodating the telephone lines not directly but in the form of DS0 on DS1. If the trouble occurs in DS1, an influence is exerted on the call control (i.e., the service), and hence something must be done.

Detail Description Paragraph:

[0174] The following is a corresponding relation with the information model (Managed Object and Service contaminant therewith) prescribed by TR-303 Supplement 3.

Detail Description Paragraph:

[0176] Managed Objects affected when a trouble occurs on the transmission path and when recovered, are analogLineTermination and isdnLineTermination. These Managed Objects have Attributes (corresponding to subscriber service state information) termed primaryServiceState and secondaryServiceState, and are set to primaryServiceState={oos}, secondaryServiceState={mt,fef} when the trouble occurs. By contrast, when recovered from the trouble, the Managed Objects are set to primaryServiceState={is}, secondaryServiceState={ }(empty).

Detail Description Paragraph:

[0181] Managed Objects affected are isdnLineTermination and isdnFramePathTermination. FIGS. 5, 6 and 7 show mappings between the protocol conversions and Managed Objects.

CLAIMS:

2. A gateway digital loop carrier device according to claim 1, wherein said gateway digital loop carrier device accommodates said integrated access device accommodating as a subscriber at least one of a telephone, a modem and ISDN and implementing a TR-008 interface, and connects said subscriber to said switch implementing a TR-303 or GR-303 interface.

3. A gateway digital loop carrier device according to claim 2, further comprising: an integrated access device side terminating unit for terminating a transmission signal sent from said integrated access device; a demultiplexing unit for demultiplexing the terminated transmission signal into a plurality of DS0 signals; and a TR/GR-303RDT unit based on TR-303 or GR-303 and having a plurality of subscriber ports for sending the DS0 signals to said switch, wherein the interface conversion is executed with respect to every one or more DS0 signals.

4. A gateway digital loop carrier device according to claim 3, further comprising a signaling converting unit for converting a subscriber line (signaling) system between TR-008 and TR-303 or GR-303.

5. A gateway digital loop carrier device according to claim 4, wherein said signaling converting unit extracts signaling information from the DS0 signals transmitted between said switch and said integrated access device, converts the extracted signaling information between TR-008 and TR-303 or GR-303, and pads the converted signaling information to the DS0 signal.

6. A gateway digital loop carrier device according to claim 5, wherein the signaling information in the TR-303 or GR-303 format is expressed in a 4-bit pattern outputted at an interval of 3 milliseconds, the signaling information in the TR-008 format is expressed in a 2-bit pattern outputted at an interval of 1.5 milliseconds, and said signaling converting unit converts the signaling information in the TR-008 format into the signaling information in the TR-303 or GR-303 format by converting the signaling information in the TR-008 format into two pieces of 2-bit patterns outputted in 3 milliseconds.

8. A gateway digital loop carrier device according to claim 5, further comprising a call control unit for executing call control of the DS0 signal with respect to said switch in accordance with TR-303 or GR-303, wherein TR-303 or GR-303 specifies that a time slot is connected to between a source and a destination of a message for connecting the time slot of the DS0 signal in accordance with this message, and said call control unit, if the control target DS0 signal contains the signaling information converted in the TR-303 or GR-303 format and if this piece of signaling information indicates an Off-Hook state of said subscriber, sends to said switch a message for connecting said time slot.

9. A gateway digital loop carrier device according to claim 2, further comprising an ISDN overhead converting unit for converting a protocol of overhead information on an ISDN D+ channel that is contained in the DS0 signal between TR-008 and TR-303 or GR-303.

10. A gateway digital loop carrier device according to claim 9, wherein said ISDN overhead converting unit, if the line type carried on the DS0 signal from said integrated access device is ISDN and if this DS0 signal carries a D+ channel, extracts monitoring/controlling information out of the ISDN overhead information contained in this DS0 signal, and converts a format of the extracted monitoring/controlling information into the TR-303 or GR-303 format.

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